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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,202	04/11/2001	Jameel Menashi	01023	1699

7590 03/13/2006

Martha Ann Finnegan, Esq.
CABOT CORPORATION
Billerica Technical Center
157 Concord Road
Billerica, MA 01821-7001

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/833,202

Applicant(s)

MENASHI, JAMEEL

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-28 is/are pending in the application.
- 4a) Of the above claim(s) 2,9,11-13,15 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10 and 17-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This office action is being provided in reply to the amendment of 02/16/06. The applicant has overcome the 35 USC 102 rejections over Bolster et al'074 and Oswin'508. Refer to the above-referenced amendment for more specific details about applicant's rebuttal arguments. However, the instant claims (including newly added claims 26-28) are rejected over the same art as set forth hereinbelow and for the reasons of record. Also, a new ground of rejection has been specifically presented for amended claim 1. Thus, this application is finally rejected.

Election/Restrictions

1. This application contains claims 2, 9, 11-13 and 15-16 drawn to an invention nonelected with traverse in Paper No. 03/03/03. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

2. The amendment filed 02/16/06 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: (claim 17) "*the fuel cell comprises an active layer comprising a carbon support that comprises at least one modified carbon product*". In essence, throughout the entire specification as filed it has been disclosed that either "*the electrode, the counter-electrode or the electrolyte membrane comprises "at least one modified*

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carbon product” (refer to applicant’s specification as filed). Therefore, the examiner notes that the present claims are silent about having one of the electrodes or the electrolyte membrane *per se* comprising the modified carbon product as instantly argued, and originally intended by the specification as filed. Claim 17, the only independent claim now by way of the 02/16/06 amendment, broadly recites that “*the fuel cell comprises an active layer comprising a carbon support that comprises at least one modified carbon product*”. There is a significant difference between having the fuel cell itself comprising the carbon-modified active layer and having one of either the electrode, the counter-electrode, or the electrolyte membrane comprising the carbon-modified active layer. The former may be including unsupported subject matter such as fuel cells components other than the electrode, the counter-electrode, or the electrolyte membrane (*viz. the seals, the gaskets, the end plates, the separators or bipolar plates, the current collectors per se and the like*); while the latter, indeed, includes the specific scope of the present invention, and therefore what applicant regards as his invention. In other words, nothing in the specification as filed does encompass or support using or making fuel cell components potentially including seals, gaskets, end plates, separators or bipolar plates, current collectors and the like comprising at least one modified carbon product as seemingly recited now in independent claim 17. It is apparent from the recitation of amended claim 17 that the fuel cell *per se* (*meaning any component thereof*) may have the at least one modified carbon product, however, such a recitation raises the issue of new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3-8, 10 and 17-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: (claim 17) *“the fuel cell comprises an active layer comprising a carbon support that comprises at least one modified carbon product”*. In essence, throughout the entire specification as filed it has been disclosed that either *“the electrode, the counter-electrode or the electrolyte membrane comprises “at least one modified carbon product”* (refer to applicant’s specification as filed). Therefore, the examiner notes that the present claims are silent about having one of the electrodes or the electrolyte membrane per se comprising the modified carbon product as instantly argued, and originally intended by the specification as filed. Claim 17, the only independent claim now by way of the 02/16/06 amendment, broadly recites that *“the fuel cell comprises an active layer comprising a carbon support that comprises at least one modified carbon product”*. There is a significant difference between having the fuel cell itself comprising the carbon-modified active layer and having one of either the electrode, the counter-electrode, or the electrolyte membrane comprising the carbon-modified active layer. The former may be including unsupported subject matter such as fuel cells components other than the electrode, the

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counter-electrode, or the electrolyte membrane (*viz the seals, the gaskets, the end plates, the separators or bipolar plates, the current collectors per se and the like*); while the latter, indeed, includes the specific scope of the present invention, and therefore what applicant regards as his invention. In other words, nothing in the specification as filed does encompass or support using or making fuel cell components potentially including seals, gaskets, end plates, separators or bipolar plates, current collectors and the like comprising at least one modified carbon product as seemingly recited now in independent claim 17. It is apparent from the recitation of amended claim 17 that the fuel cell per se (*meaning any component thereof*) may have the at least one modified carbon product, however, such a recitation raises the issue of new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

5. Claims 1, 3-8, 10 and 17-28 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The specific subject matter "*wherein the electrode or the counter electrode or both comprise at least one modified carbon product*" is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). In essence, throughout the entire specification as filed it has been disclosed that either "*the electrode, the counter-electrode or the electrolyte membrane comprises 'at least one modified carbon product'*" (refer to applicant's specification as filed). Additionally, on page 8, 1st full paragraph of the amendment dated 02/16/06, applicant has argued that: "*As clarified by the amendment to claim 1, an active layer is present in the gas diffusion electrode or counter-electrode or both*". Therefore, the examiner notes that the present claims are silent about having one of the electrodes or the electrolyte membrane comprising the modified carbon product as instantly argued, and originally

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intended in the specification as filed. Claim 17, the only independent claim now by way of the 02/16/06 amendment broadly recites that "*the fuel cell comprises an active layer comprising a carbon support that comprises at least one modified carbon product*". There is a significant difference between having the fuel cell itself comprising the carbon-modified active layer and having one of either the electrode, the counter-electrode, or the electrolyte membrane comprising the carbon-modified active layer. The former may be including fuel cells components other than the electrode, the counter-electrode, or the electrolyte membrane (i.e. the seals, the gaskets, the end plates, the separators or bipolar plates, the current collectors per se and the like) as not instantly disclosed in the specification as filed; while the latter, indeed, includes the specific scope of the present invention, and therefore what applicant regards as his invention.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claim 17 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 6881511. Although the conflicting claims

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are not identical, they are not patentably distinct from each other because of the following reasons:

The US patent '511 claims the following (see claims 1-2):

1. A metal-air battery comprising a gas diffusion electrode comprising a blocking layer and an active layer, wherein said blocking layer or said active layer, or both comprise at least one modified carbon product and at least one binder, said modified carbon product comprising at least one carbon product having attached at least one organic group. 60

2. A fuel cell comprising a gas diffusion electrode comprising a blocking layer and an active layer, wherein said blocking layer or said active layer, or both comprise at least one modified carbon product and at least one binder, said 65

modified carbon product comprising at least one carbon product having attached at least one organic group.

3. The fuel cell of claim 2, wherein the fuel cell is a solid polymer electrolyte fuel cell.

In this case, it is noted that the claims of US patent '511 fully encompass and at once envisage the use of a modified carbon product in a solid polymer fuel cell and/or metal-air battery. Furthermore, it is noted that a metal air battery cell is a type of fuel cell which require also needs to have a reactant fed into the cell.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

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subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 3-8, 10 and 17-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Yu et al 6399202.

The applied reference has a assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

The instant application is drawn to a fuel cell wherein the claimed inventive concept comprises an electrode comprising at least one modified carbon product having specific group attached thereto. Other limitations include the specific blocking layer and active layer; the binder-free active layer; the specific solid electrolyte membrane; and the specific organic group.

As to claims 1, 17 and 22:

Yu et al disclose gas diffusion electrodes containing modified carbon products wherein the modified carbon product is a carbon product having attached at least one organic group (abstract). It is further disclosed that the Yu et al's invention relates to gas diffusion electrodes such as the ones used in fuel cells and also relates to modified carbon products used to form one or more components of the gas diffusion electrodes (col 3, lines 44-49/ col 3, lines 56-60). It is disclosed that gas diffusion electrodes prepared with modified carbon material have broad applications, one example of a gas diffusion electrode application would be a phosphoric acid type fuel cell using a pair of gas diffusion electrodes or for solid polymer electrolyte fuel cells

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(col 8, lines 45-50 & line 54). It is noted that Yu et al mentions publications in which they all are incorporated in their entirety by reference (col 8, lines 45-61). In addition, it is mentioned that the present invention can also be used in fuel cells; wherein each of these applications can incorporate the modified carbon material of the present invention in the electrode to obtain the discussed benefits (col 9, lines 3-4 and lines 8-13). *In view of this, it is inherent that a fuel cell should at least comprise two electrodes and an electrolyte to satisfy mechanical, chemical and kinetic requirements (basic components) so as to obtain a fully functional or working fuel cell which converts electrochemical energy into electrical energy.*

Yu et al directly disclose the gas diffusion electrode including the carbon supports therefor (COL 1, lines 5-12/ COL 15, lines 38-43); and in combination with electrocatalyst particles (COL 1, lines 30-35/ COL 13, lines 15-20/ COL 2, lines 50-65) for the preparation of an active layer material (EXAMPLES 14-15/ COL 12, line 50 to COL 13, line 28).

Yu et al disclose that the modified carbon product can be used for at least one component of the electrodes such as the active layer and/or the blocking layer (ABSTRACT). Examples 12-16 describe the formation of such a layer (EXAMPLES 12-16). *Thus, Yu et al describe with sufficient specificity that carbon-modified product is present in a layered form.*

Yu et al disclose the preference of proton conduction properties (COL 2, line 60-64). *Furthermore, since the specifically recited carbon modified material i.e. (the carbon support that comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group that is proton conducting" covers a very large number of applicable materials which can be used therefor, it is*

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also contended that a layer comprising any combination of carbon modified materials would produce a layer exhibiting the specific proton conducting property.

Moreover, products of identical chemical composition (i.e. carbon modified materials comprising a carbon product having attached at least one organic group) can not have mutually exclusive properties, and thus, the claimed property (i.e. proton conducting), is necessarily present in the prior art material.

As previously mentioned, in particular, it is noted that Yu et al in column 2, lines 19-30 and 53-65 incorporates in its entirety by reference the teachings of Dirven et al 5561000 who discloses a gas diffusion electrode for an electrochemical cell with solid electrolyte (ABSTRACT of Dirven et al'000 which is incorporated by reference). It is further disclosed that a fuel cell is mainly composed of the assembly of a cathode, an anode and in between them a solid electrolyte membrane (col 3, lines 7-11 of Dirven et al'000 which is incorporated by reference).

Examiner's note: it is noted that the limitation "a thickness of about 5 microns or less" does include 0 as a lower limit. Thus, the foregoing limitation also reads on "a layer free" or "a thickness of 0 micron". (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Thus, no active layer is required.

As to claim 3:

It is disclosed that the modified carbon product can be used for at least one component of electrodes such as the active layer and/or the blocking layer (abstract). It is disclosed that with respect to air diffusion electrode which is generally used in fuel cells, this type of electrode generally is constructed to have a blocking layer and an active layer (col 3, lines 62-65).

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As to claim 4:

It is disclosed that the blocking layer, the active layer or both contain at least one modified carbon product; thus, it is preferred that the modified carbon product comprise at least one carbon product having attached at least one organic group (col 4, lines 31-47).

As to claims 4, 6, 18-19, 21 and 24-25:

It is disclosed that with respect to the active layer, preferably the active layer contains a modified carbon product wherein the carbon product preferably has attached at least one type of hydrophobic organic group (col 4, line 66 to col 5, line 10). Yu et al also disclose a gas diffusion layer wherein a catalytic layer is formed on a porous back support by mixing catalyst particles of Pt (col 2, lines 50-57); wherein in some cathode structures the solution is made of PT/C catalyst powder (col 2, lines 62-65). It is further noted that Yu et al's teaching refers to a technique disclosed by US patent 5,561,000 which is incorporated in its entirety by reference herein (col 2, lines 19-21 and 50-65). *Thus, Yu et al's teaching fully encompasses the teachings of the '000 patent.*

With respect to claim 5:

It is noted that Yu et al in column 8, lines 38-61 incorporates in its entirety by reference the teachings of Cabasso et al 5783325 who discloses electrolytic gas diffusion electrodes for fuel cells (ABSTRACT of Cabasso et al'325 which is incorporated by reference) wherein the active catalytic layer has a thickness between about 7 Tm and about 50 Tm (col 4, lines 50-56 of Cabasso et al'325 which is incorporated by reference). It is noted that the disclosed thickness range, particularly from 7-10 Tm, falls within the instantly claimed range. *Accordingly, this thickness magnitude provides good performance, provides a gas diffusion electrode with*

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favorable chemical and electrical properties for fuel cells, provides a gas diffusion electrode with a controlled electrode structure, porosity and size making it possible to formulate each structure with properties that are most suitable for its function.

As to claim 7:

It is disclosed that one preferred advantage of the present invention is the ability to reduce such fluorine containing compounds in the blocking layer or active layer; the proper choice of organic groups attached onto the carbon product to form the modified carbon product can lead to a decrease if not an elimination of fluorine containing compounds (col 7, line 23-35); such fluorine containing compounds typically used are polytetrafluoroethylene and/or perfluoric sulphonic acid polymer (col 7, lines 17-21).

Regarding claim 8:

It is noted that Yu et al in column 2, lines 19-30 and 53-65 incorporates in its entirety by reference the teachings of Dirven et al 5561000 who discloses gas diffusion electrode with catalyst for an electrochemical cell with solid electrolyte (ABSTRACT of Dirven et al'000 which is incorporated by reference) wherein the electrolyte is made of an ion exchange polymer or ionomer such as polytetrafluoroethylene (col 3, lines 32-40 of Dirven et al'000 which is incorporated by reference). It is taught that solid electrolyte membranes are made of an ion exchange polymer or ionomer because such material is very suited (col 3, lines 32-40 of Dirven et al'000 which is incorporated by reference).

As to claim 10:

It is disclosed that said organic group is $\text{p-C}_6\text{H}_4\text{SO}_3\text{Na}^+$ (claim 9). Thus, this specific ionic organic group comprises the instantly claimed organic group.

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As to claim 14:

It is disclosed that the functional groups forming anions are ionizable (col 5, lines 15-16) and it is understood that cationic counter ions can be exchanged to other ions through an ion-exchange process (col 5, lines 42-44). Examples of ionizable functional groups that form cationic groups are disclosed (col 5, lines 15-40; col 5, line 57 to col 6, line 15). *Thus, it should be recognized that the organic group is either a proton-conducting group or electrode-conducting group.*

Concerning claim 23:

Disclosed is the use of a Co-containing material as a cationic metal catalytic material (COL 13, lines 15-20); as well as Pt (COL 2, lines 50-65).

With respect to claims 26-28:

Yu et al disclose hydrophobic organic groups (COL 6, lines 34-37).

Thus, the claims are anticipated.

10. Claims 1, 17 and 26-28 are (at least) rejected under 35 U.S.C. 102(e) as being anticipated by Tosco et al 6881511.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

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As to claims 1 and 17:

Tosco et al disclose gas diffusion electrodes containing modified carbon products wherein the modified carbon product is a carbon product having attached a least one organic group; and can be used for at least one component of the electrodes such as the active layer and/or the blocking layer (ABSTRACT). Tosco et al disclose that their invention relates to gas diffusion electrodes such as the ones in metal-air batteries and fuel cells (COL 3, lines 65-67/ COL 4, lines 15-20/ COL 8, line 65 to COL 9, line 10/ COL 9, lines 22-26). *It is noted that the counter-electrode and the electrolyte are fuel cell components which are necessarily presented therein so as to have a functional fuel cell. In view of this, it is inherent that a fuel cell should at least comprise two electrodes and an electrolyte to satisfy mechanical, chemical and kinetic requirements (basic components) so as to obtain a fully functional or working fuel cell which converts electrochemical energy into electrical energy.*

Tosco et al disclose that the modified carbon product can be used for at least one component of the electrodes such as the active layer and/or the blocking layer (ABSTRACT).

Examples 12-15 describe the formation of such a layer (EXAMPLES 12-16). *Thus, Tosco et al describe with sufficient specificity that carbon-modified product is present in a layered form.*

Tosco et al disclose the preference of proton conduction properties (COL 2, line 67 to Col 3, line 3). *Furthermore, since the specifically recited carbon modified material i.e. (the carbon support that comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group that is proton conducting" covers a very large number of applicable materials which can be used therefor, it is*

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also contended that a layer comprising any combination of carbon modified materials would produce a layer exhibiting the specific proton conducting property.

Moreover, products of identical chemical composition (i.e. carbon modified materials comprising a carbon product having attached at least one organic group) can not have mutually exclusive properties, and thus, the claimed property (i.e. proton conducting), is necessarily present in the prior art material.

Examiner's note: it is noted that the limitation "a thickness of about 5 microns or less" does include 0 as a lower limit. Thus, the foregoing limitation also reads on "a layer free" or "a thickness of 0 micron". (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Thus, no active layer is required.

With respect to claims 26-28:

Tosco et al disclose hydrophobic organic groups (COL 6, lines 50-60).

Thus, the claims are anticipated.

11. Claims 1 and 17 are (*at least*) rejected under 35 U.S.C. 102(b) as being anticipated by Swathirajan et al 5316871.

Swathirajan et al disclose membrane- electrode assemblies for electrochemical cells (TITLE), particularly, fuel cells (COL 1, lines 20-23). It is disclosed that fuel cells include first and second electrodes and a solid-polymer electrolyte membrane; each electrode is adhered to a respective one of the first and second membrane surfaces (COL 1, lines 42-50) and each electrodes comprise a respective group of finely divided carbon particles, finely divided catalytic particles supported in internal and external surfaces of the carbon particles and a proton

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conductive material intermingled with the catalytic and carbon particles (COL 1, lines 51-57).

Divulged is that the carbon groups contains carboxylic groups on the carbon surface (*the organic group*) (COL 12, lines 60-65). Swathirajan et al disclose that is known to attach or bond the organic groups thereto (COL 12, lines 60-65).

Examiner's note: it is noted that the limitation "a thickness of about 5 microns or less" does include 0 as a lower limit. Thus, the foregoing limitation also reads on "a layer free" or "a thickness of 0 micron". (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Thus, no active layer is required.

Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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14. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Yu et al 6399202; and/or b) Tosco et al 6881511; and/or c) Swathirajan et al 5316871 as applied to claim 17 above, and further in view of Watakabe et al 2003/0198854.

Yu et al, Tosco et al and Swathirajan et al are applied, argued and incorporated herein for the reasons above. However, none of the preceding prior art references specifically disclose the thickness of the carbon modified layer.

Watakabe et al disclose that is known to use fuel cells comprising a membrane electrolyte, a cathode and an anode (ABSTRACT) wherein the gas diffusion electrode has a gas diffusion electrode layer having a thickness of 10 μm (P. 0152).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in pertinent art at the time the invention was made to make the carbon-modified layer of either Yu et al, Tosco et al or Swathirajan et al by having the specific layer thickness of Watakabe et al as Watakabe et al disclose that is known in the art to use gas diffusion electrode comprising a gas diffusion electrode layer having a thickness of 10 μm for the benefit of providing a fuel cell exhibiting satisfactory terminal voltages and improved performance. *In this instant, Watakabe et al directly teach a layer in a gas diffusion electrode structure having a thickness within the claimed range.*

Response to Arguments

15. Applicant's arguments filed 02/16/06 have been fully considered but they are not persuasive. Applicant overcame the art rejections over Bolster et al'074 and Oswin'508. In consequence, the examiner will only address applicant's arguments concerning Yu et al'202, Tosco et al'511, and Swathirajan et al'871.

16. The gist of applicant's arguments is premised on the assertion that the prior art of record does not disclose "*A modified carbon product having attached at least one organic group that is proton-conducting*". However, this assertion is respectfully disagreed with. For instance, both Yu et al and Tosco et al disclose the preference of proton conduction properties in their gas diffusion-catalytic support bodies as presented supra. Additionally, since the specifically recited carbon modified material i.e. ("*the carbon support that comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group that is proton conducting*") covers a very large number of applicable materials which can be used therefor, it is also contended that a layer comprising any combination of carbon modified materials would produce a layer exhibiting the specific proton conducting property. Moreover, products of identical chemical composition (i.e. *carbon modified materials comprising a carbon product having attached at least one organic group*) can not have mutually exclusive properties, and thus, the claimed property (i.e. proton conducting), is necessarily present in the prior art material.

17. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "*As clarified by the amendment to claim 1, an active layer is present in the gas diffusion electrode or counter-*

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electrode or both, and the layer has a film thickness of 10 microns or less" [See the 02/16/06 amendment at page 8, 1st full paragraph]) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). No where in independent claim 17 the examiner can find the foregoing limitations (*i.e. a) the active layer being part of the gas diffusion electrode or counter-electrode or both; and b) the specific thickness of the layer*). Thus, applicant's arguments are not commensurate in scope with the presently claimed invention of independent claim 17.

18. In response to applicant's argument that Swathirajan et al'871 only indicates an oxidized surface and does not indicate an attached organic group, it is contended that the prior art reference discloses the use of carbon groups containing carboxylic groups on the carbon surface (*the organic group*) (Swathirajan et al'871-COL 12, lines 60-65). Swathirajan et al further disclose that is known to attach or bond the organic groups thereto (COL 12, lines 60-65). Therefore, Swathirajan et al'871 readily envision attaching or bonding an organic group such as a carboxylic group to the surface of the carbon material.

19. With respect to applicant's arguments regarding the "*or less*" phrase" (*i.e. "a thickness of 10 microns or less"*), the examiner herein maintains his position that such a phrase does not intend to recite a positive limitation per se, and does include 0 as a lower limit. Thus, the foregoing limitation also reads on "a layer free" or "a thickness of 0 micron". (See MPEP 2173.05(c) *Numerical Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges*). If applicant intends to recite a positive magnitude or thickness of the layer, applicant is required to positively include or recite a lower limit greater than or no less than 0 for such purposes. The

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language of claim 1, as it stands right now, can be fairly construed as an unintentional attempt to recite a layer-free or a layer having a thickness of 0 micron. *Simply put and in the context of the claimed invention, a fuel cell just comprising a modified carbon material regardless of its specific form or structure therein.* Thus, since applicant contends that claim 1 recites layer thicknesses greater than 0 microns, there should be no concerns about amending claim 1 to recite so; otherwise, for purposes of clarity and infringement, the examiner avers that claim 1 encompasses 0 as a lower limit for thickness dimension, and hence, no active layer is required in the fuel cell, that is to say, the specific carbon modified material can be present in any form other than in a layer (e.g. as a powder material; a particulate matter, or a dissolved substance or the like). (*Emphasis added*→) The examiner wants to clarify that interpreting the claim language, as set forth above, in no way means that the examiner is overlooking or ignoring the positive presence of the specific carbon modified-material, but it permits the examiner not to give patentable weight to the apparent formation of a further structure such as a dimensioned layer containing thereof. Otherwise stated, the recitation of claim 17 and combination with claim 1 still allows the interpretation of having a carbon-modified material in a free state or freely-distributed in the fuel cell.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Primary Examiner
Art Unit 1745


RAYMOND ALEJANDRO
PRIMARY EXAMINER